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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/910,886	07/24/2001	Miki Ogawa	35.C15586	3334

11

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EXAMINER
BAREFORD, KATHERINE A

ART UNIT	PAPER NUMBER
1762	

DATE MAILED: 08/29/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/910,886	OGAWA, MIKI	
	Examiner	Art Unit	
	Katherine A. Bareford	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 July 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 4-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers Claim 3 is canceled.

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on July 25, 2003 has been entered.

Specification

2. The disclosure is objected to because of the following informalities: at page 1 of the specification, lines 5-8, the sentence is grammatically unclear.

Appropriate correction is required.

Claim Objections

3. The Examiner suggests clarifying claim 1 grammatically. The amendment of July 25, 2003 to claim 1, lines 5-6 results in the phrase "drying said substrate to remove the solvent contained in said solution for forming a material . . .". It appears that this phrase would be better worded grammatically to read "drying said substrate to remove the solvent contained in said solution to form a material . . .".

Double Patenting

4. The provisional obvious double patenting rejection of claims 1-8, 12-16 and 20-24 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 24-47 and 53-54 of copending Application No. 09/478,884 is withdrawn due to applicant's amendments to the claims on July 25, 2003.

5. The provisional obvious double patenting rejection of claims 1-8, 12-16 and 20-24 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-22 of copending Application No. 09/657,616 is withdrawn due to applicant's amendments to the claims on July 25, 2003.

Claim Rejections - 35 USC § 102

6. The rejection of claims 1-8, 12-16 and 20-22 under 35 U.S.C. 102(f) because the applicant did not invent the claimed subject matter is withdrawn due to the withdrawal of the provisional obvious double patenting rejection using 09/478,884 and 09/657,616 and the statement by applicant's attorney that the applications were commonly owned at the time of applicant's invention (see the amendment of July 25, 2003).

7. The rejection of claims 1, 2, 4, 11 (depending from claim 4), 12, 19 (depending from claim 12) and 20-24 under 35 U.S.C. 102(b) as being anticipated by Bruinsma et al (US 5922299) is withdrawn due to applicant's amendments and arguments of July 25, 2003.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1, 2, 4, 5, 7, 9-13, 15 and 17-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bruinsma et al (US 5922299) in view of Miyata, et al "Alignment of Mesoporous Silica on a Glass Substrate by a Rubbing Method" (hereinafter "Miyata").

Bruinsma teaches a method of manufacturing material. Column 1, lines 10-20. A solution is provided that contains a solvent (water), silicon and a surfactant. Column 6, lines 55-65, column 7, lines 20-55 and column 8, lines 50-55. The solution is contacted with a substrate. Column 8, lines 10-25 and 55-65. The coated substrate is dried to remove the solvent contained in the solution and to form a porous material. Column 8, lines 15-20. The porous material has an ordered channel structure in which the surfactant is held within the porous material. Column 2, lines 15-25, column 4, lines 25-35 and column 9, lines 5-25 (the later calcining burns out the surfactant).

Claim 2: the silicon is contained in the solution in the state of compound. Column 7, lines 20-40.

Claim 4: Bruinsma teaches a method of manufacturing material. Column 1, lines 10-20. A solution is provided that contains a solvent (water), silicon alkoxide and a surfactant. Column 6, lines 55-65, column 7, lines 20-55 and column 8, lines 50-55. The solution is contacted with a substrate. Column 8, lines 10-25 and 55-65. The coated substrate is dried to remove the solvent contained in the solution and to form a porous material. Column 8, lines 15-20. The porous material has an ordered channel structure in which the surfactant is held within the porous material. Column 2, lines 15-25, column 4, lines 25-35 and column 9, lines 5-25 (the later calcining burns out the surfactant).

Claim 12: Bruinsma teaches a method of manufacturing material. Column 1, lines 10-20. A solution is provided that contains a solvent (water), silicon alkoxides and a surfactant. Column 6, lines 55-65, column 7, lines 20-55 and column 8, lines 50-55. The solution is contacted with a substrate. Column 8, lines 10-25 and 55-65. The coated substrate is dried to remove the solvent contained in the solution and to form a porous material. Column 8, lines 15-20. The porous material has an ordered channel structure in which the surfactant is held within the porous material. Column 2, lines 15-25, column 4, lines 25-35 and column 9, lines 5-25 (the later calcining burns out the surfactant). After the forming of the porous material the surfactant is removed by calcining. Column 9, lines 5-25.

Claim 19: the substrate can be coated with the solution by a dip coating method. Column 8, lines 15-20.

Claim 20: Bruinsma teaches a method of manufacturing material. Column 1, lines 10-20. A solution is provided that contains a solvent (water), silicon and a surfactant. Column 6,

lines 55-65, column 7, lines 20-55 and column 8, lines 50-55. The solution is attached to a substrate. Column 8, lines 10-25 and 55-65. The coated substrate is dried to remove the solvent contained in the solution and to form a porous material. Column 8, lines 15-20. The porous material has an ordered channel structure in which the surfactant is held within the porous material. Column 2, lines 15-25, column 4, lines 25-35 and column 9, lines 5-25 (the later calcining burns out the surfactant).

Claim 21: silicon is contained in the solution in the form of compound. Column 7, lines 20-40.

Claim 22: the silicon is contained in the solution as silicon alkoxides. Column 7, lines 20-40.

Claim 23: Bruinsma teaches a method of manufacturing material. Column 1, lines 10-20. A solution is provided that contains a solvent (water), silicon and a surfactant. Column 6, lines 55-65, column 7, lines 20-55 and column 8, lines 50-55. The solution is contacted with a substrate. Column 8, lines 10-25 and 55-65. The coated substrate is dried to remove the solvent contained in the solution and to form a porous material. Column 8, lines 15-20. The porous material has an ordered channel structure in which the surfactant is held within the porous material. Column 2, lines 15-25, column 4, lines 25-35 and column 9, lines 5-25 (the later calcining burns out the surfactant).

Claim 24: after the porous material is formed, the surfactant is removed. Column 9, lines 5-25.

Bruinsma teaches all the features of these claims except (1) the patterned application, (2) the pen lithography application and (3) the ink jet application method, (4) the substrate with alignment control ability, (5) the uniaxially aligned channel structure parallel to the substrate and (6) that the substrate is precoated with a polymer compound film subjected to a rubbing process. However, while Bruinsma teaches a spin coating application method, Bruinsma also teaches that films may also be deposited by spraying, painting or dip coating. See column 8, lines 10-25. The key issue is to provide a coating that has a high surface area to volume ratio. See column 6, lines 55-68 and column 4, lines 15-25.

Miyata teaches a method of preparing a porous material, a mesoporous silica. See page 1609, abstract. A substrate is provided. See page 1610 , "Experimental Section". The substrate is provided with a polyimide film that is treated by rubbing (to give alignment control). See page 1610 , "Experimental Section" and the first column. A solution is provided. See page 1610 , "Experimental Section". The solution contains silicon alkoxide and a surfactant. See page 1610 , "Experimental Section". The solution is placed in contact with the substrate. See page 1610 , "Experimental Section". Then after contact, the substrate is dried to remove the solvents contained in the solution. See page 1610 , "Experimental Section". The substrate is also calcined, which removes the surfactant. See page 1610 , "Experimental Section". This provides a coating with an aligned structure. See page 1610. The aligned structure is such that the channels are uniaxially aligned in the "rubbing direction". See page 1610 and figures on page 1611. This provides channels uniaxially aligned parallel to the substrate, since the rubbing direction on the film would be parallel to the substrate.

It is the Examiner's position that pen lithography and ink jet application are well known application methods for applying thin lines of liquid on a substrate. The Examiner notes that ink jet application is a form of atomizing and spraying a liquid. If applicant disagrees, he should so state.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Bruinsma to use a substrate provided with a precoating of a rubbed polymer film as suggested by Miyata to provide a desirable ordered alignment of the coating, because Bruisma teaches the desire to provide an ordered mesoporous silica film, and Miyata teaches a that it is desired to provide an ordered film where the pores are aligned and a desirable substrate to provide such alignment when making aligned mesoporous films. As a result, the combination of Bruinsma and Miyata would provide a the use of substrate with alignment control ability (the substrate precoated with a polymer compound film subject to a rubbing process) and the resulting uniaxially aligned channel structure parallel to the substrate . It would further have been obvious to modify Bruinsma in view of Miyata to provide a patterned coating on the substrate by a method such as pen lithography or ink jet coating with an expectation of achieving a desired coating, because Bruinsma teaches that a variety of methods can be used to deposit the coating, as long as it has a high surface to volume ratio including spraying, painting or dip coating, and it is the Examiner's position that pen lithography and ink jet applications would be well known methods that fall within the suggested methods, since pen lithography provides the drawing of thin lines that would fall within the teaching of painting and ink jet is a well known form of droplet spraying. The teaching of methods such as painting would provide a clear suggestion of

providing a patterned coating as desired, since the application of a material by painting would be conventionally understood to require a controlled placement of coating at individual portions of the substrate.

10. Claims 6 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bruinsma in view of Miyata as applied to claims 1, 2, 4, 5, 7, 9-13, 15 and 17-24 above, and further in view of MacDougall et al (US 6365266).

Bruinsma teaches all the features of these claims except that the substrate is a silicon single crystal substrate with 110 orientation. Bruinsma does teach that the substrate can be a silicon wafer. See column 8, lines 40-50.

MacDougall teaches applying a coating to a substrate. Column 1, lines 15-20. The coating is in the form of a solution with a silicon alkoxide and a surfactant that is applied to the substrate. See column 2, lines 55-65 and column 3, lines 10-68. The applied coating is calcined to form a mesoporous silica film. See column 6, lines 5-20 and column 1, lines 15-20. The substrate used can be a single crystal silicon wafer. See column 5, lines 5-20.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Bruinsma in view of Miyata to apply the coating to a substrate of a single crystal silicon wafer as suggested by MacDougall with an expectation of forming a desirable coated wafer, because Bruinsma in view of Miyata teaches a desirable process of forming a coating using a solution with a silicon alkoxide and a surfactant applied to the surface and MacDougall teaches that a desirable surface for forming a coating using a solution with a silicon alkoxide and a

surfactant applied to the surface is a silicon single crystal wafer. As to the orientation of the single crystal silicon, MacDougall provides no limitation as to the orientation, and thus, one of ordinary skill in the art would expect desirable results from the various possible orientations. While the teaching of Bruinsma in view of Miyata would further suggest that a rubbed polymer coating would be applied to the surface of this single crystal substrate prior to the coating of the solvent/silicon/surfactant solution, this is not prevented by the claims as worded.

11. Claims 8 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bruinsma in view of Miyata as applied to claims 1, 2, 4, 5, 7, 9-13, 15 and 17-24 above, and further in view of Fuchs et al (US 5246784).

Bruinsma in view of Miyata teaches all the features of these claims except that the substrate is coated with a Langmuir-Blodgett film of polymer compound. Miyata does teach that the substrate is coated with a polyimide film. See page 1610, "Experimental Section". It is desirable for the film to be in the nanometer range. See page 1610, "Experimental Section".

Fuchs teaches applying a coating to a substrate. Column 1, lines 5-20. The coating is a polyimide that is applied to the substrate. See column 1, lines 5-20. The applied coating is applied by a Langmuir-Blodgett technique to form a thin coating, thinner than by a normal spin coating. See column 1, lines 5-30 and column 2, lines 5-65. The coating can be 0.3 to 500 nm. See column 2, lines 60-65. The substrate used can be a silicon wafer. See column 2, lines 35-40.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Bruinsma in view of Miyata to apply the polyimide coating to the substrate by the Langmuir-Blodgett method as suggested by Fuchs with an expectation of forming a desirable coated wafer, because Bruinsma in view of Miyata teaches a desirable process of forming an aligned coating using preliminary coating of a polyimide applied to the surface and Fuchs teaches that a desirable method for forming a nanometer thick polyimide coating is by the Langmuir-Blodgett process.

Response to Arguments

12. Applicant's arguments filed July 25, 2003 have been fully considered but they are not persuasive.

Applicant argues that Bruinsma does not actually disclose the unixaially aligned channel structure, and that Miyata and the other secondary references fails to teach what is absent from the reference. Miyata discloses, according to applicant, that the material is manufacture in solution, and thus is not formed during drying, and therefore, the invention is not made prima facie obvious by combining Miyata and Bruinsma. Applicant further states that he believes that it is not possible to obtain the claimed structure during the drying step by combining the teachings of Miyata and Bruinsma. As to MacDougall, applicant further argues that this reference has no disclosure concerning formation of the structure during the drying step. Applicant further states that he believes that it is not possible to obtain the claimed structure during the drying step by combining the teachings of MacDougall and Bruinsma.

The Examiner has reviewed these arguments, however, the rejection is maintained. The Examiner has withdrawn the rejection using Bruinsma alone, and has provided the rejection using Bruinsma in view of Miyata as to the independent claims (see the discussion of the rejected claims in the 35 USC 103 rejections above). It is the Examiner's position that the use of the substrate with the polymer coating that has been rubbed as suggested by Miyata in the process of Bruinsma would provide the claimed uniaxially aligned channels for the reasons discussed in the rejection above. While Miyata may use a different process to apply the coating than Bruinsma, Miyata does suggest the desirability of using a rubbed polymer coating on the substrate. While applicant states that he believes that it is not possible to obtain the claimed structure during the drying step by combining the teachings of Miyata and Bruinsma, the Examiner disagrees. It would be apparent that using the substrate with the rubbed polymer coating of Miyata in the process of Bruinsma would provide the claimed uniaxially aligned channels, because such a substrate meets the requirements of applicant for the claimed "substrate having alignment control ability" and the rest of the claimed process is identical to that claimed by Bruinsma. As to MacDougall, the Examiner notes that the formation of the uniaxially aligned channels is provided by the references to Bruinsma and Miyata.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (703) 308-0078. The examiner can normally be reached on M-F(7:00-4:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P. Beck can be reached on (703) 308-2333. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

KATHERINE A. BAREFORD
PRIMARY EXAMINER
GROUP ~~1100~~ 1700